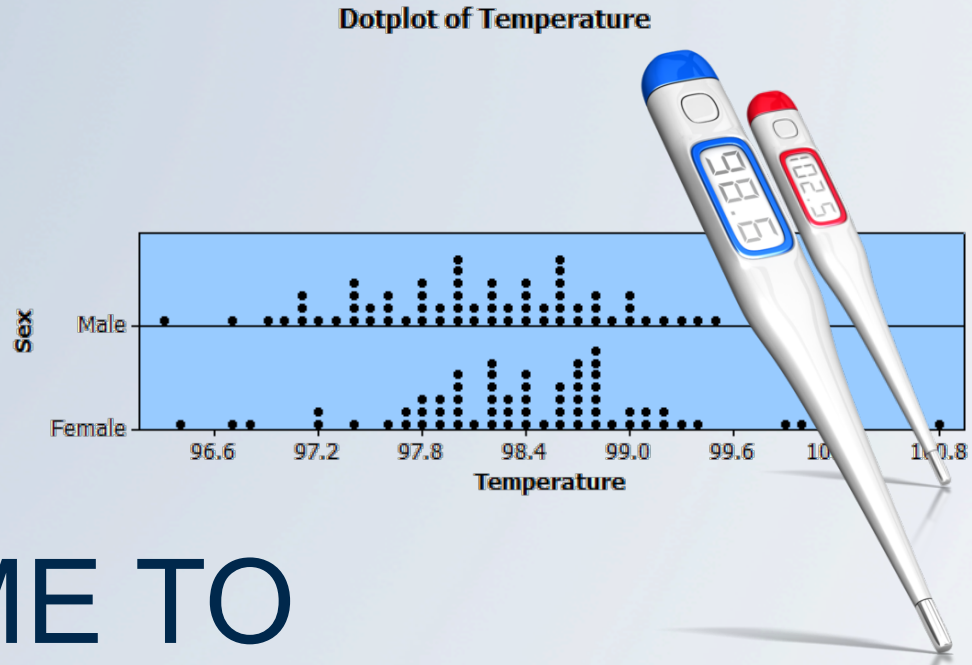


WELCOME TO *IMPLEMENTING COMMON CORE in MIDDLE SCHOOL MATH*

IMSA®

Karen Togliatti, Curriculum and PD Specialist

Common Core

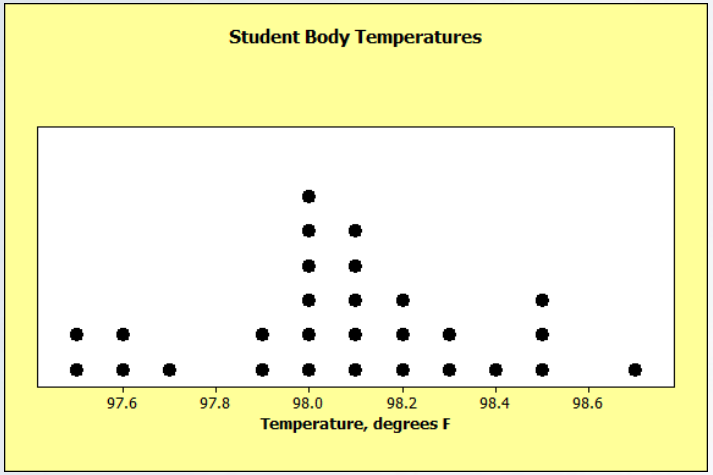
Students must be provided with tasks and activities that allow them to engage in productive dialogue and work collaboratively.

CC Math Practice Standards

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Analyzing Body Temperature Activity

Is the “normal” human body temperature really 98.6°F? Students will investigate this question by collecting data for their class on body temperatures using disposable student thermometers and will summarize and describe the distribution of data using numeric summaries and graphic displays.



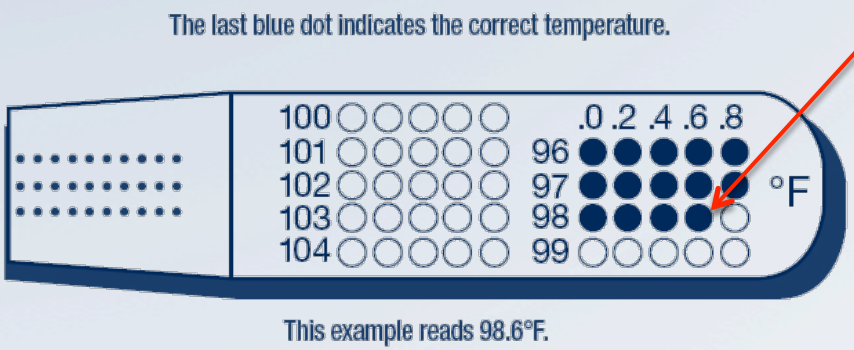
Variable	Mean	Median	Range	IQR
TEMP	98.071	98.100	1.200	0.350

IMSA®

Materials and Procedure

Per participant

- One disposable thermometer
- Yellow Post-it note
- Blue or Pink Post-it Note
- Marker



- Remove thermometer from wrapper
- Place under tongue as far back as possible and close mouth for 60 seconds
- Remove from mouth. Wait about ten seconds for device to lock in accuracy (some blue dots may disappear)
- Read temperature indicated by the last blue dot and record using the marker on both Post-its
- Throw away wrapper and thermometer

IMSA®

Body Temperature Data

(using Yellow Post-it Note)

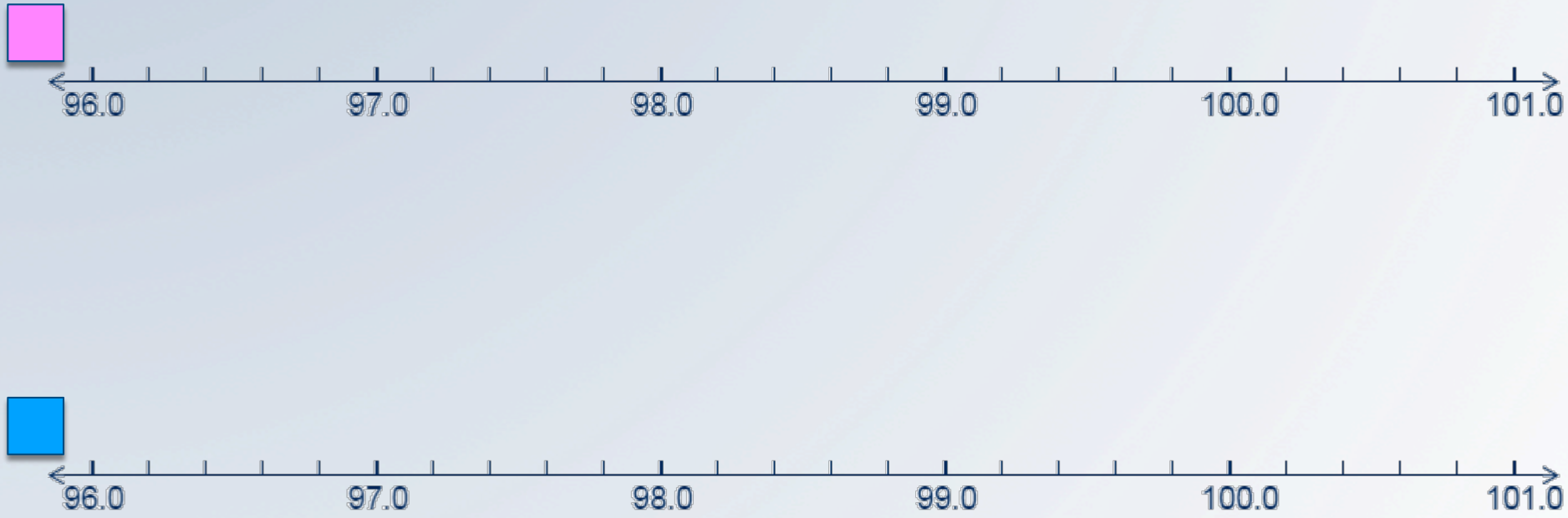
Body Temperature Data

(using Blue and Pink Post-it Notes)

IMSA®

Body Temperature Data

(using Blue and Pink Post-it Notes separately)



Analyzing Data

http://www.statcrunch.com/app/index.php?dataid=661807

- CCSS.Math.Content.6.SP.A.1

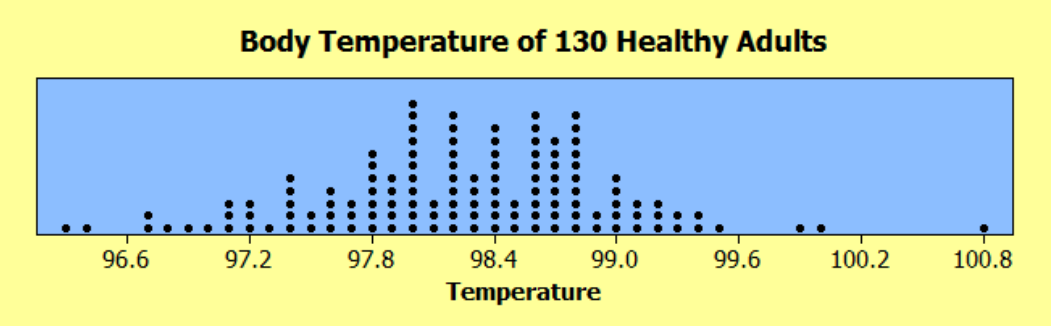
  Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.

Is the mean body temperature of participants 98.6°F?

- CCSS.Math.Content.6.SP.A.2

  Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

The distribution is bell-shaped with data clustered around the value of 98.3°F. The range of the data is about 4.5°F. One value at 100.8°F seems higher than the rest.



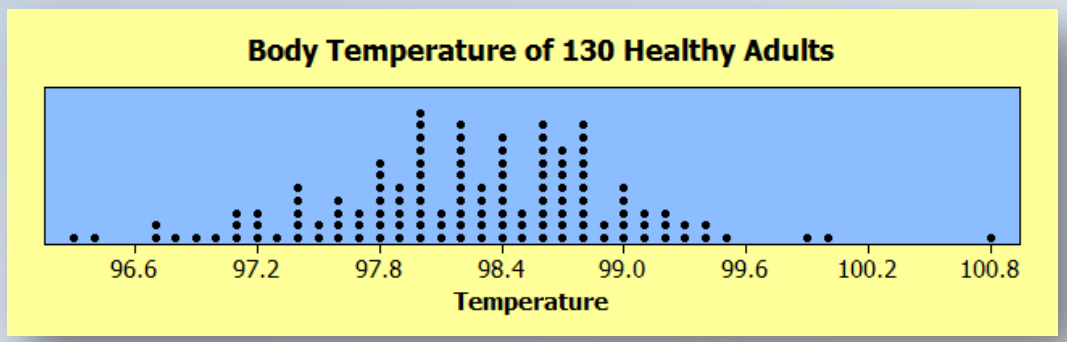
IMSA®

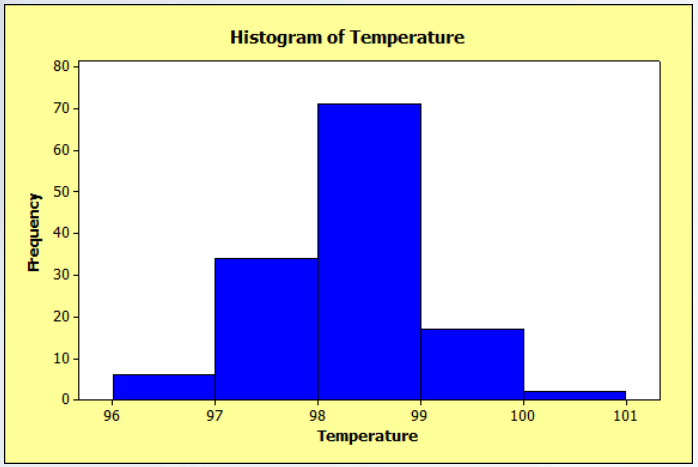
Analyzing Data

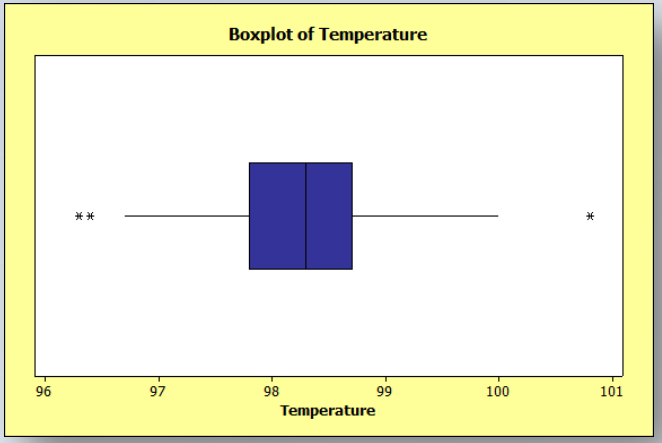
http://www.statcrunch.com/app/index.php?dataid=661807

- **CCSS.Math.Content.6.SP.B.4**

  Display numerical data sets in plots on a number line, including dot plots, histograms, and box plots.







IMSA®

Analyzing Data

http://www.statcrunch.com/app/index.php?dataid=661807

- CCSS.Math.Content.6.SP.B.5

  Summarize numerical data sets in relation to their context.

A data set of 130 randomly selected healthy male and female adults' body temperature was taken using a disposable thermometer. The data was taken to investigate the claim that the mean body temperature for the population is 98.6°F. Our data had a median temperature of 98.3°F, lower than the "normal" body temperature, and an interquartile range of 0.9°F which means that 50% of our observations were between Q1 at 97.8°F and Q3 at 98.7°F. The number of observations at or below 98.6°F is 91/130, or about 70%. Two values seemed much lower than the others according to the boxplot, while one value seemed much larger than the others, perhaps meaning that the individual had a fever. Since there were outliers present, the median and IQR were chosen as measures of center and spread.

IMSA®

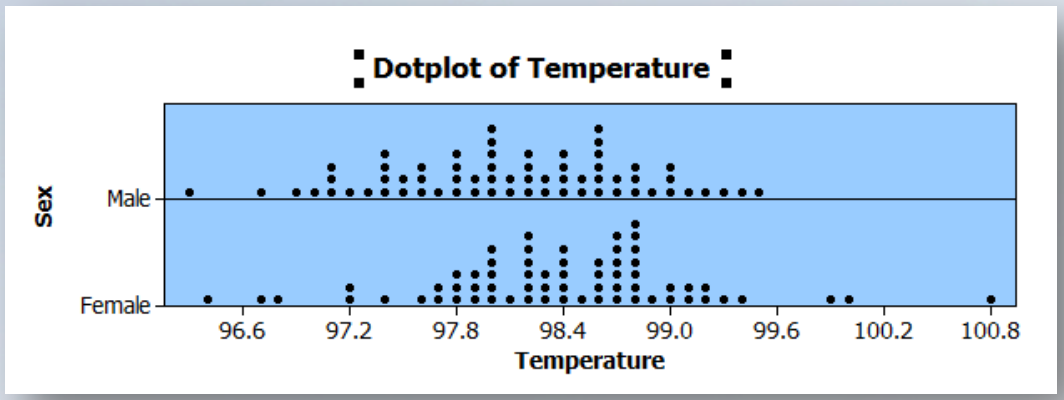
Analyzing Data

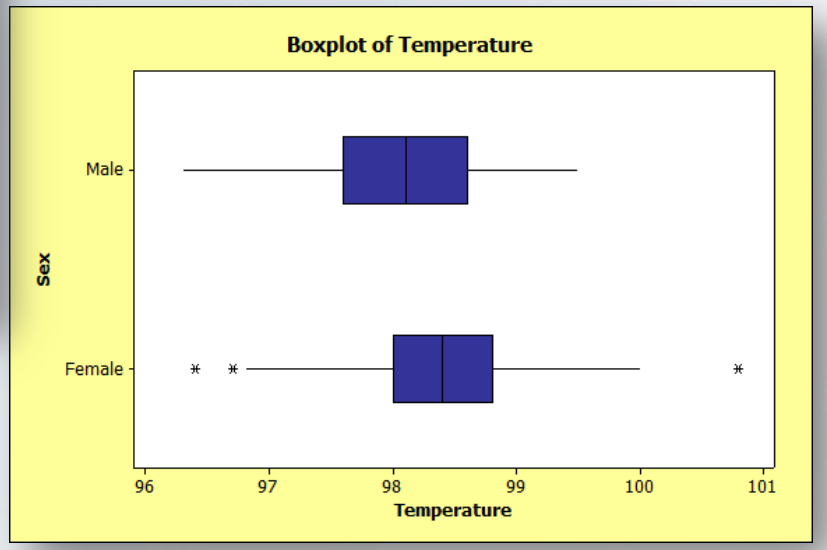
http://www.statcrunch.com/app/index.php?dataid=661807

- CCSS.Math.Content.7.SP.B

  Draw informal comparative inferences about two populations.

Compare the distributions of male and female body temperature data.





IMSA®

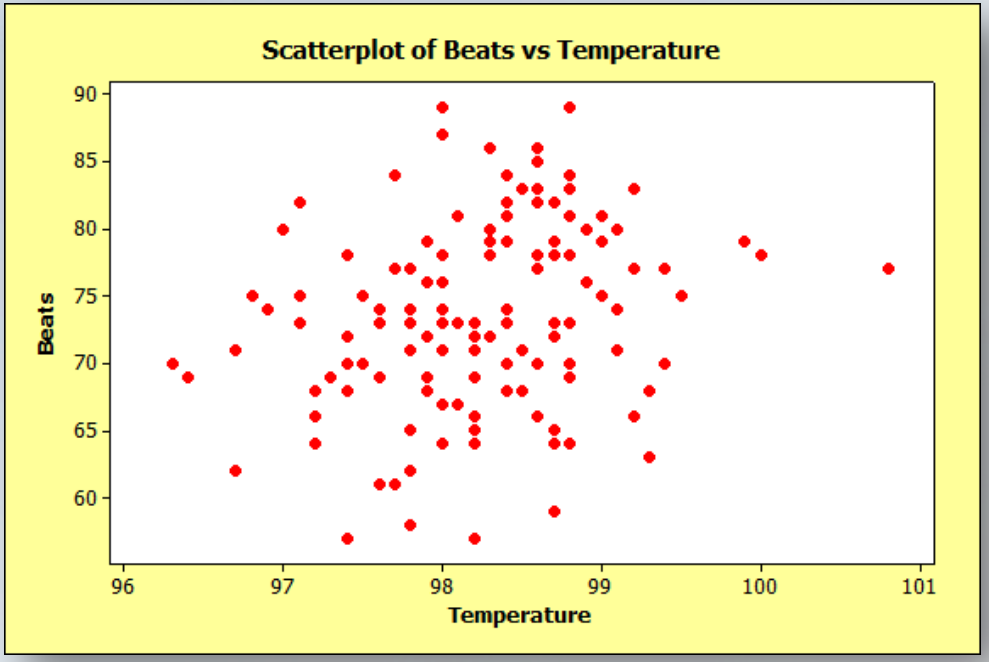
Analyzing Data

http://www.statcrunch.com/app/index.php?dataid=661807

- CCSS.Math.Content.8.SP.A.1

  Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.

Is there an association between body temperature of participants and number of heart beats per minute?



There appears to be a very weak, positive linear association between body temperature and heart rate.

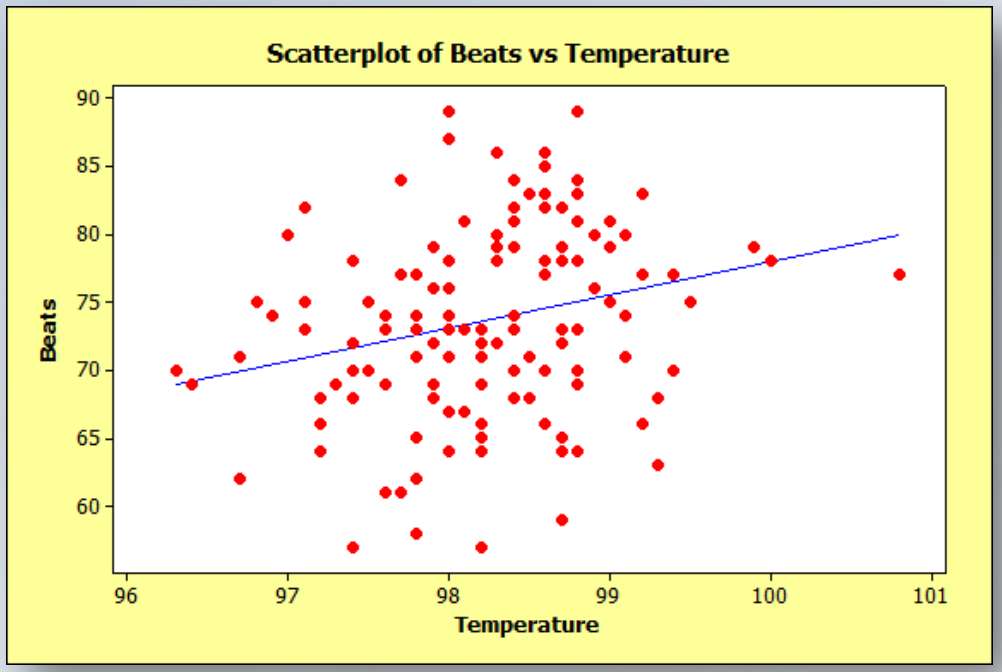
IMSA®

Analyzing Data

http://www.statcrunch.com/app/index.php?dataid=661807

- ## CCSS.Math.Content.8.SP.A.2

  Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.



The trend line shown has a slope of about 2.4 which means that as the temperature increases by one degree Fahrenheit, the heart rate increases by about 2.4 beats per minute. I would not be comfortable using this model for prediction since the points are not very close to the line.

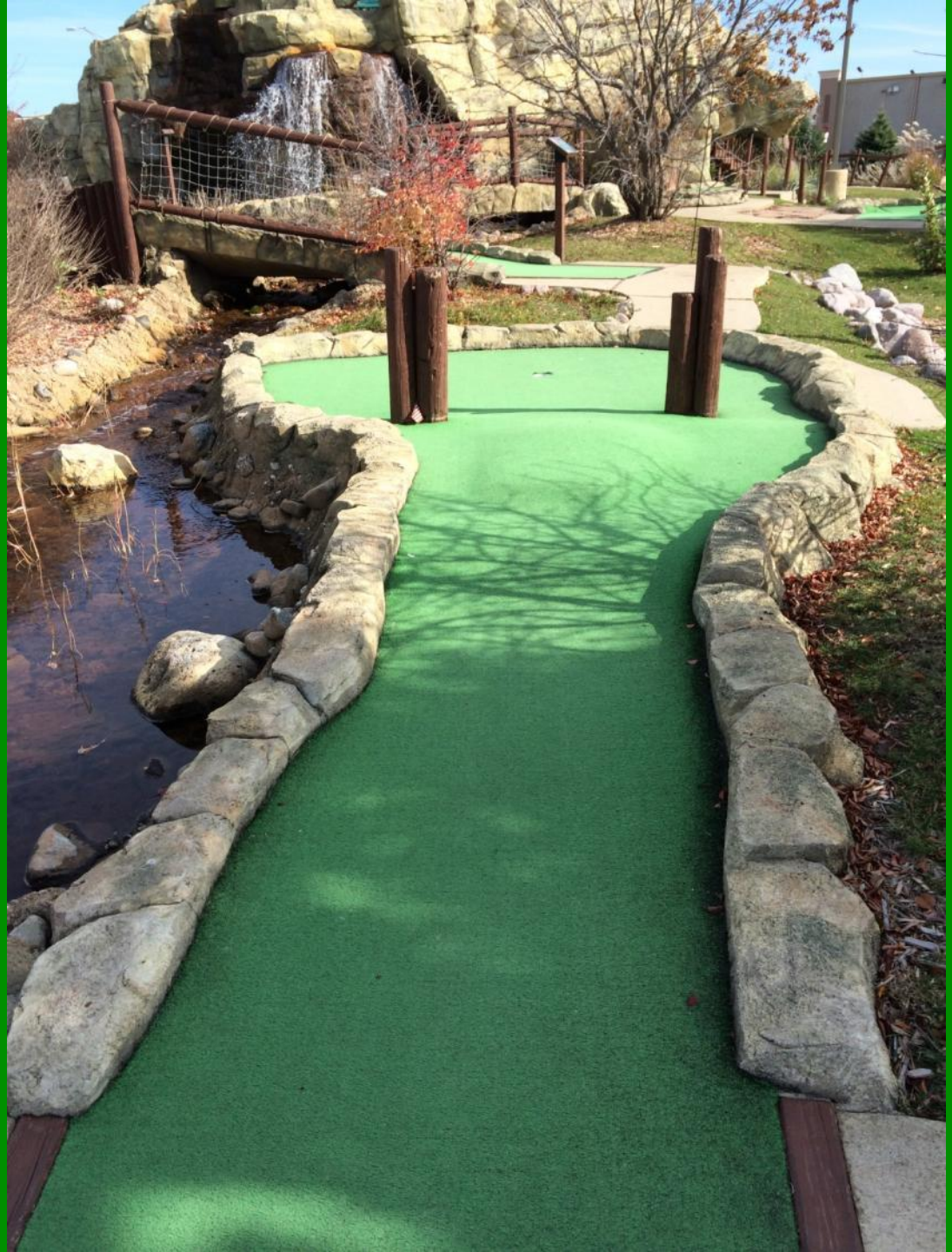
IMSA

Integer Mini Golf

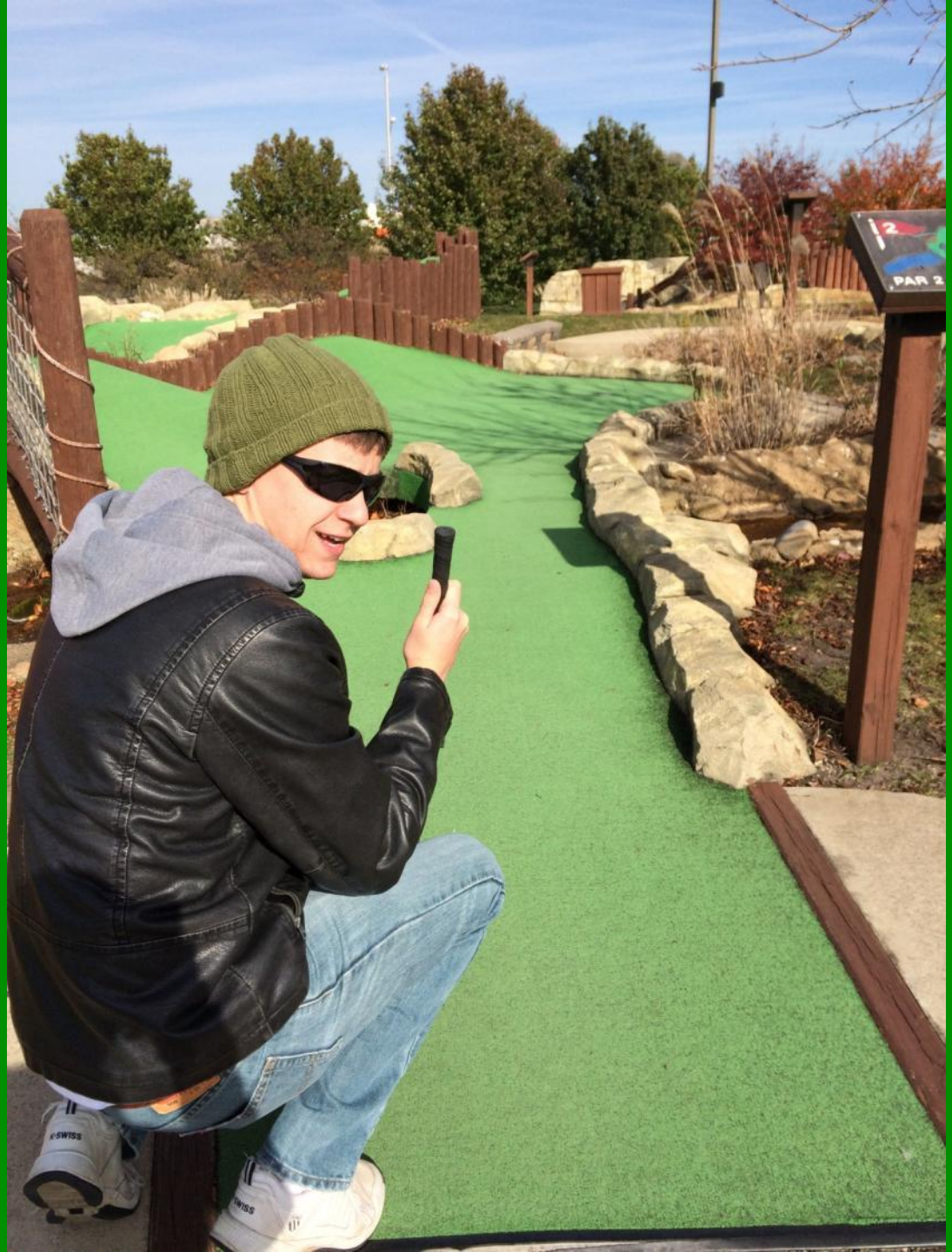
Pictures from Wilderness Falls

Bolingbrook, IL

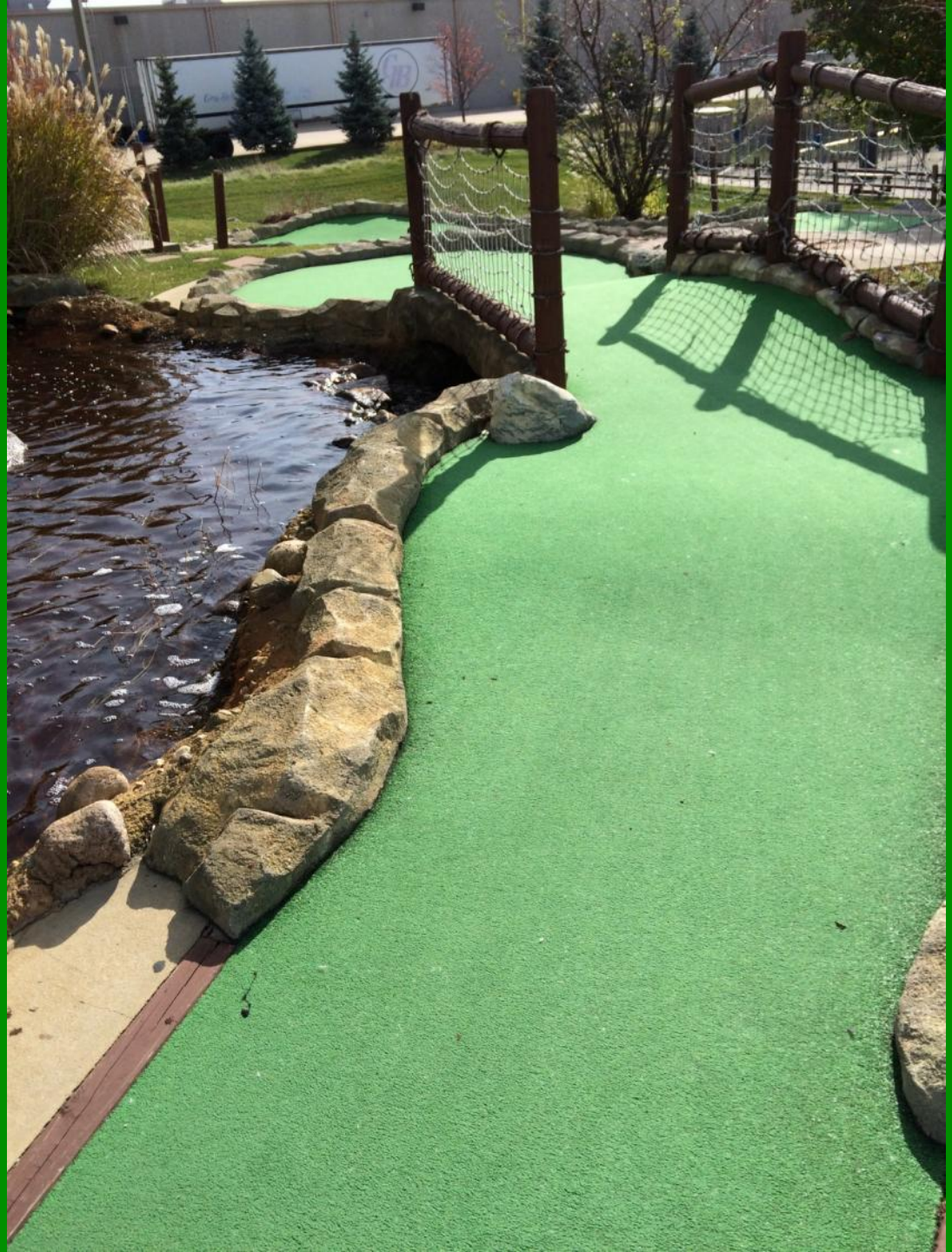
Hole 1



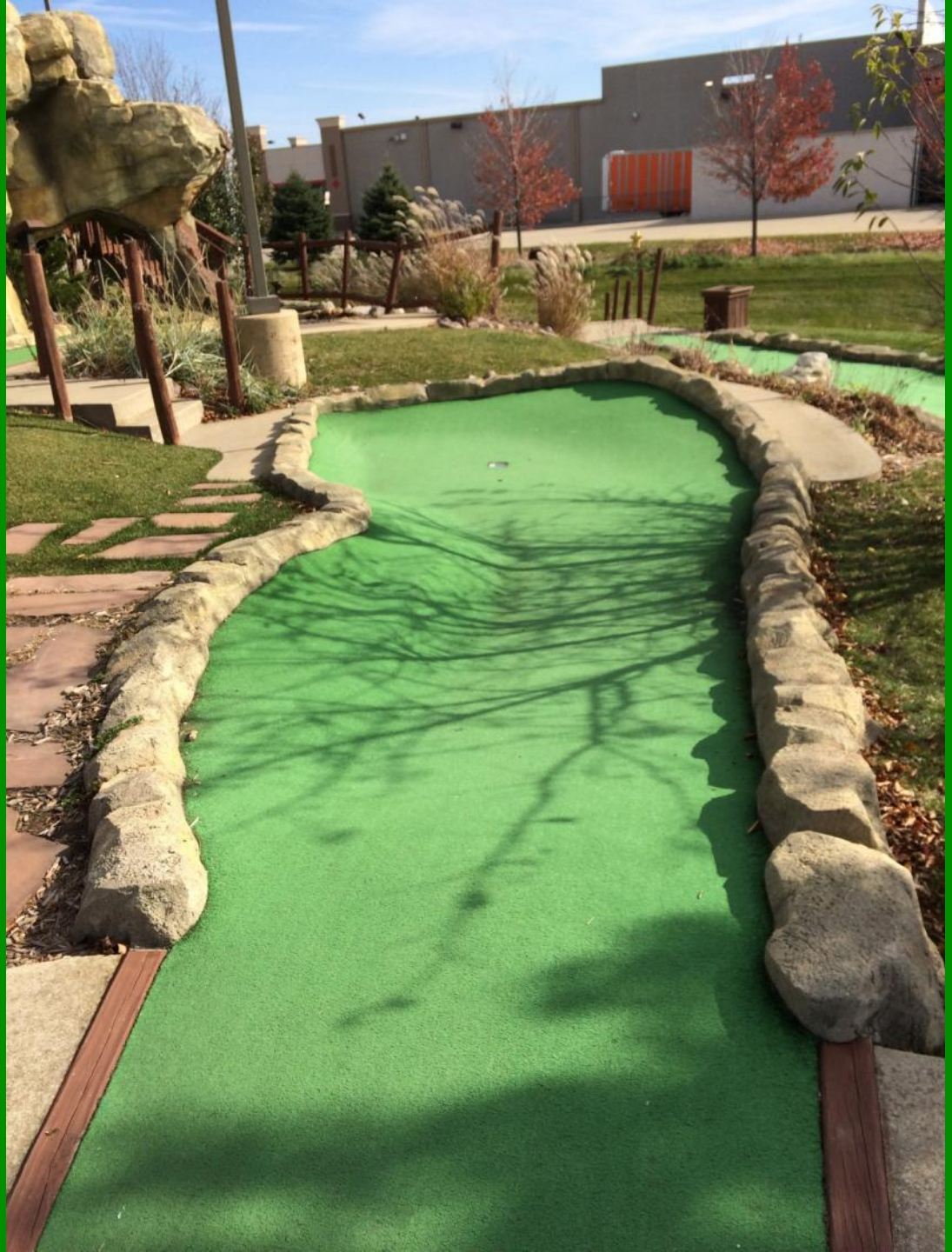
Hole 2


2
PAR 2

Hole 3



Hole 4



Hole 5

Hole 6

Introduction to Integers Activity

Hole	Par	Number of strokes	Above or below par?	Total Par	Total Strokes	Overall score
1	3	4	+1	3	4	+1
2	3	3	0	6	7	+1
3	2	4	+2	8	11	+3
4	4	2	-2	12	13	+1
5	3	1				

Hole	Par	Number of strokes	Above or below par?	Total Par	Total Strokes	Overall score
1						
2						
3						

Introduction to Integers: On Par

- CCSS.Math.Content.6.NS.C.5

  Understand that positive and negative numbers are used together to describe quantities having opposite directions or values. Use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

If par for a hole on a golf course is the desired number of strokes for that hole, we can effectively set the value of "par" to zero. Then, scores above par would be measured in the number of positive strokes above the set value of par, and scores below par would be measured in the number of negative strokes below par.

If par is 3 strokes, shooting 4 strokes for the hole would be recorded as +1, and shooting 2 strokes for the hole would be recorded as -1.

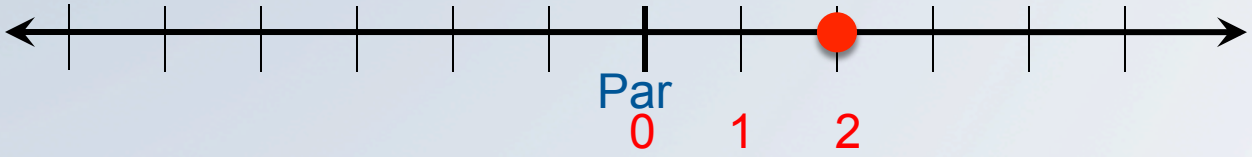
IMSA®

Introduction to Integers: On Par

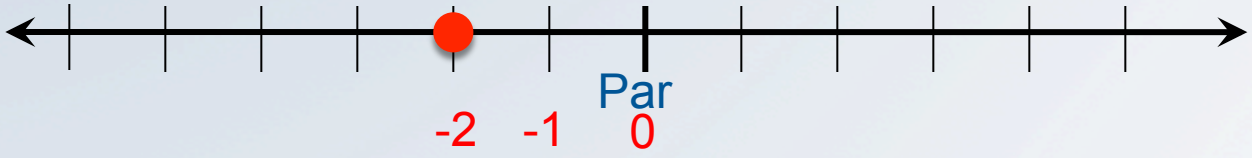
- CCSS.Math.Content.6.NS.C.6a

  Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line.

Show what two strokes above par would look like on a number line



Show what two strokes below par would look like on a number line



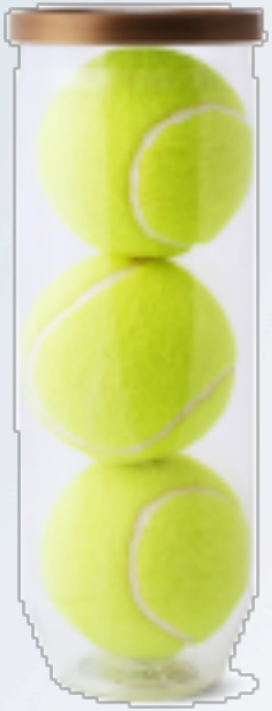
IMSA®

Deriving the Circumference Formula Activity

Description of Circle	Circumference	Diameter	Ratio *Circumference/ Diameter*

Deriving the Circumference Formula Activity

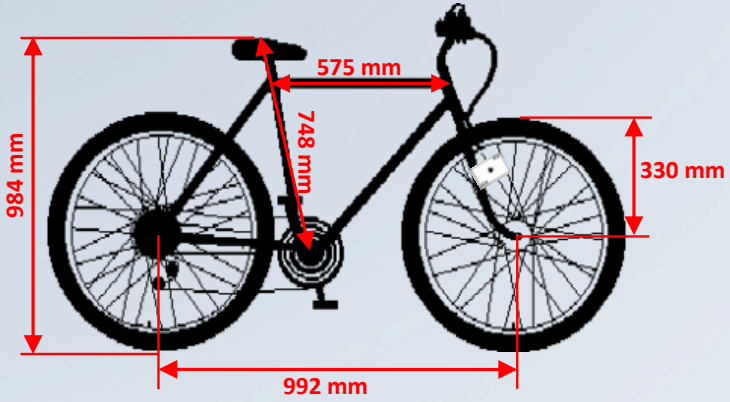
Without opening the can of tennis balls, cut a piece of kite string that will fit exactly around the circumference of one of the tennis balls.



Deriving the Circumference Formula Activity

You have placed a playing card  between the spokes of your new bicycle to make a cool clicking noise while you ride to your friend's house. During your ride, you count that it took 400 clicks to reach your friend's house. How far did you ride?

Your bicycle has the following dimensions:



Deriving the Circumference Formula

- CCSS.Math.Content.7.RP.A.2.a

  Decide whether two quantities are in a proportional relationship. (Testing for equivalent ratios in a table)

Dividing the Circumference of each measured circular object by its associated diameter gives a constant ratio of about 3. These quantities represent a proportional relationship.

- CCSS.Math.Content.7.G.B.4

  Know the formulas for the area and circumference of a circle and use them to solve problems.

Use the idea of circumference to predict the distance traveled by counting the number of revolutions of a bicycle tire given its radius.

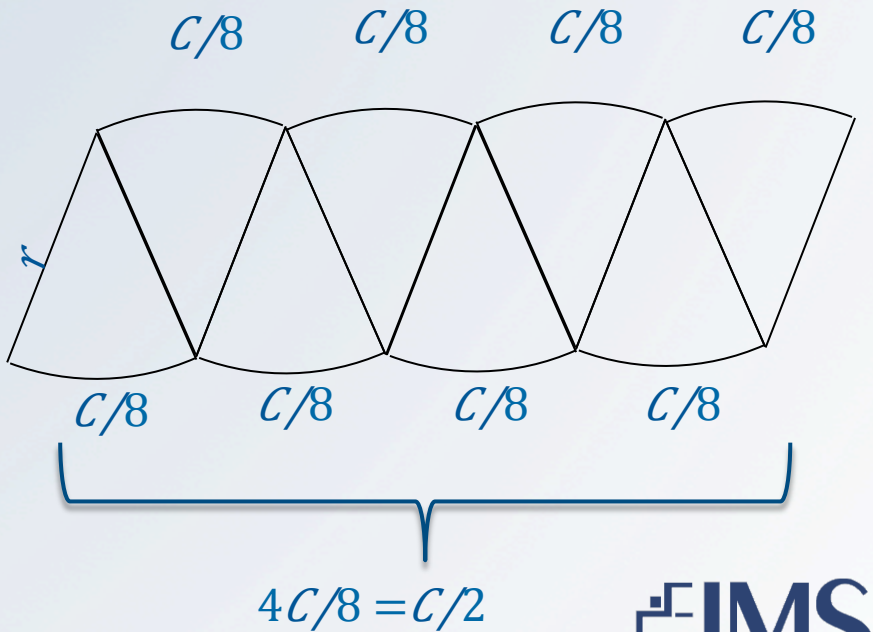
IMSA®

Deriving the Circumference Formula

- CCSS.Math.Content.7.G.B.4
  Give an informal derivation of the relationship between the circumference and area of a circle

Use a flattened paper plate with a measured circumference to determine a formula for area of a circle using the formula for area of a parallelogram.

$$A = bh$$
$$= C/2 \times r$$
$$= 2\pi r/2 \times r$$
$$= \pi r^2$$



IMSA

Comparing Multiple Function Representations Activity

Problem Card	Algebraic Function Card	Graph Card	Table Card	Justification

Comparing Multiple Function Representations

- **CCSS.Math.Content.8.F.B.4**
  Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship, including reading from a table or from a graph.
- **CCSS.Math.Content.8.F.A**
  Define, evaluate, and compare functions.